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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,196	07/29/2003	Chih-Chin Chang	B-5175 621088-1	9242
36716	7590	08/09/2004	EXAMINER	
LADAS & PARRY 5670 WILSHIRE BOULEVARD, SUITE 2100 LOS ANGELES, CA 90036-5679			NGUYEN, THANH T	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 08/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/630,196

Applicant(s)

CHANG ET AL.

Examiner

Thanh T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-17 is/are allowed.
- 6) ☒ Claim(s) 18-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119

(a)-(d).

### ***Oath/Declaration***

Oath/Declaration filed on 7/29/03 has been considered.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 18-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Hamada et al. (U.S. Publication No. 2003/0203545).

Referring to figures 1a-8b, Hamada et al. teaches a method of forming a CMOS thin film transistor device on a substrate having at least one NMOS are, the NMOS area having a doped area, a lightly doped area and a gate area, the method comprising the steps of:

- a) forming a semiconductor layer (104-107) on the substrate (101);
- b) patterning the semiconductor layer to form an semiconductor island (104-107) in the NMOS area (see figure 1A);
- c) forming a dielectric layer (108, called insulating) on the semiconductor island and the substrate;
- d) forming a metal layer (109/110) on the dielectric layer;
- e) removing part of the metal layer to form a first metal layer in the lightly doped area and the gate area (117);
- f) using the first metal layer as a mask, performing an  $n^+$ -ion implantation to form a source/drain region in the semiconductor island in the doped area (see figure 1b, paragraph#64);

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g) performing a dry etching(called anisotropic etch) procedure to remove part of the first metal layer, thus forming a gate with symmetrical cone shape and exposing the dielectric layer in the lightly doped area, wherein a bottom width of the gate is narrower than that of the metal layer, and the symmetrical cone shape is gradually thinner from the bottom to top (see figure 2a, paragraph# 65); and

h) using the gate as a mask, performing an  $n^+$ -ion implantation to form a LDD region in the semiconductor layer in the lightly doped area, and thus forming an NMOS element in the NMOS area (see figure 3a, paragraph# 67).

Regarding to claim 19, the angle at the bottom of the symmetrically cone shape is less than  $45^\circ$  (see col. 85, wherein the outside angle is  $45-75^\circ$ , therefore the inside angle is  $15-45^\circ$  which meet the limitation of claim 19).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada et al. (U.S. Publication No. 2003/0203545).

Hamada et al. teaches all of the limitations s described in the claimed invention above. However, the reference does not teach the specific etching selectivity.

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It would have been obvious to a person of ordinary skill in the requisite art at the time of the invention was made to optimize the etching selectivity of photoresist layer to the metal layer, since it has been held that where the general conditions of a claim are disclosed in the prior art (i.e.-etching selectivity), discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233 (CCPA 1955).

The specification contains no disclosure of either the critical nature of the claimed arrangement (i.e.- etching selectivity of the first photoresist layer to the metal layer ranges from 1 to 1/4) or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a claim, the applicant must show that the chosen limitations are critical. In re Woodruff, 919 F.2d 1575, 1578 (FED. Cir. 1990).

Therefore, it would have been obvious to a person of ordinary skill in the requisite art at the time of the invention was made would choose the optimum etching selectivity of the photoresist to the metal layer in process of Hamada et al. in order to control the etching.

#### ***Allowable Subject Matter***

Claims 1-17 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: None of the prior art alone or in combination teaches or suggests the particular subset of the process steps in performing a third patterning process using a third photomask to remove the remaining second metal layer in the second doped area, thus forming a second gate on the dielectric layer in the second gate area and performing a P ion implantation to form the second

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source/drain region in the second semiconductor island in the second doped area, thus forming a PMOS element in the PMOS area.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Nguyen whose telephone number is (571) 272-1695, or by Email via address Thanh.Nguyen@uspto.gov. The examiner can normally be reached on Monday-Thursday from 6:00AM to 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached on (571) 272-1702. The fax phone number for this Group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956 (**See MPEP 203.08**).



Thanh Nguyen  
Patent Examiner  
Patent Examining Group 2800

TTN